

Augmenting Sedation with Hypnosis in Drug-Dependent Patients

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The successful use of conscious sedation in patients physically dependent on centrally acting drugs is problematic for the dental anesthesiologist because of the concomitant development of tolerance to standard sedative agents. Dosage requirements necessary to adequately sedate these patients are often higher than recommended and carry an increased risk of drug overdose. The following report summarizes our experience with 18 drug-dependent patients in whom hypnosis was employed in conjunction with a standard sedation regimen. Attempts to complete various dental procedures while employing sedation alone on these patients had previously failed. All patients exhibited highly fearful or phobic behavior toward dental treatment as assessed by the Corah Dental Anxiety Scale. If an intravenous sedative regimen (midazolam or diazepam plus methohexital) was employed, hypnotic induction preceded the administration of the sedative drugs. If an intramuscular sedative regimen was employed (meperidine plus promethazine), the hypnotic induction took place after drug administration. With the combined hypno-sedative approach, treatment outcomes were judged to be good or excellent in 11 of 18 patients. Interestingly, in five of seven patients for whom the treatment outcome was rated poor or fair, the possibility of tolerance or cross-tolerance existed between a drug being abused and the sedative regimen. In contrast, this possibility existed in only 1 of 11 patients with good or excellent treatment outcomes. We conclude that hypnosis can augment the effects of sedation in this patient population. However, it is also important to

choose a sedative regimen where tolerance is unlikely to exist.

The use of conscious sedation techniques in fearful drug addicts is frustrating to many dentists who treat this patient population. Abuse of drugs produces changes in mood and behavior, and prolonged self-administration produces tolerance to many of the standard sedative regimens (Table 1).¹ For example, patients who are physically dependent on heroin develop drug tolerance not only to heroin but to all members of the opioid class, including those commonly employed in sedation regimens such as meperidine and fentanyl. In addition, cross-tolerance has been reported to exist between various drug groups of the sedative-hypnotic class, including alcohols, benzodiazepines, barbiturates, and carbamates.¹⁻³ A clinical implication of this is the possibility that patients who are physically dependent on alcohol will also exhibit pharmacologic tolerance to the sedative agents diazepam, midazolam, and methohexital. Because of the development of drug tolerance, standard doses of sedative agents often do not sufficiently sedate drug-dependent patients, and their excessive body movements and groaning often interrupt dental treatment. Though the development of tolerance usually increases the sedative dose required to produce respiratory and cardiovascular depression, the degree to which this occurs is unpredictable. It is thus possible that sedative dosage requirements in these patients may in fact approach the threshold for serious morbidity.

To complicate matters, patients dependent on stimulants, such as amphetamines and cocaine, often try to "balance" their agitation by simultaneously taking opioids, benzodiazepines, barbiturates, or alcohol. This usage can evoke both complex psychophysiologic responses and a polypharmaceutical drug addiction.^{1,2}

Hypnosis has been used as an aid in the treatment of

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Table 1. Drugs that Produce Dependence and Tolerance

Group	Physical Dependence ^a	Psychological Dependence ^a	Tolerance ^a
Opioid analgesics	+++	+++	+++
Sedative hypnotics, alcohol	++	+++	++
Amphetamines	+++	+	+++
Cocaine	++	++	+

^a +++ = marked, ++ = moderate; + = slight.

Adapted from Aston R: Drug abuse. In: Neidle EA, Yagiela JA, eds: Pharmacology and Therapeutics for Dentistry, 3 ed. St Louis, CV Mosby Co., 1989:643.

apprehensive dental patients and in dental patients with a history of allergies to local anesthetics.⁴⁻¹⁰ In fact, hypnoanalgesia has been employed in place of pharmacologically induced anesthesia in patients undergoing various surgical procedures,^{11,12} and hypnotic relaxation techniques have also been shown to considerably diminish drug dosage requirements, especially those of analgesics in surgical patients.¹³⁻¹⁵ Hypnosis has also been used as an auxiliary method of preparing a patient for surgery and as an aid in postoperative pain control. The fact that a patient still requires some form of pharmacologic management does not detract from the benefits achieved by hypnosis.¹⁶ Recently it was reported that hypnosis significantly decreased crying and pulse rates in children receiving local anesthetic injections.¹⁷

Grinker and Spigel have employed oral barbiturates (pentobarbital or amobarbital) in combination with hypnotic induction 30 min afterwards to produce a state of drug-assisted hypnosis, which they term narcosynthesis.¹⁸ A similar technique employing oral diazepam in apprehensive dental patients has also been reported.¹⁹ Hypnotic induction, followed by intramuscular ketamine, has been reported to be beneficial in reducing crying and struggling in pediatric dental patients.²⁰ It must be appreciated that hypnosis and hypnosis-augmented pharmacosedation is not as predictable as other therapeutic modalities because individuals vary greatly in their susceptibility to hypnotic suggestion.²¹

PATIENT POPULATION

Eighteen patients requiring dental treatment were referred to our dental clinics because of their fear of dental treatment and a history of various drug dependencies. Their demographics and drug abuse history are summarized in Table 2. Before initiation of dental treatment, patient anxiety was assessed employing the Corah Dental Anxiety Scale.²² Scores of 13 or greater indicate highly

fearful or phobic behavior. All but one patient (who scored 12) fit this criterion.

Initially, standard sedation regimens of either intravenous midazolam, intravenous diazepam plus methohexital, or intramuscular meperidine plus promethazine were administered to patients. The choice of the regimen employed was mainly based on the anticipated length of the procedures. Those patients undergoing relatively short procedures received one of the intravenous regimens; those undergoing procedures of long duration were sedated with the intramuscular regimen. In all cases the sedation produced by these regimens did not adequately control patient struggling and body movements necessary to successfully render dental treatment. Only after standard sedation regimens had failed were patients rescheduled to receive a combination of hypnosis and sedation.

HYPNOTIC/SEDATION PROCEDURES

Immediately before the administration of hypnosis and sedation, patients were asked to perform the eye-roll test. The test requires only a few seconds and involves instructing the patient to gaze upward as high as possible while, at the same time, attempting to slowly close their eyelids. Based on the amount of sclera visible between the border of the iris and the lower eyelid, patients were scored from 0 to 4. The more sclera that was visible, the higher the score and, theoretically, the more readily hypnotized.^{19,23}

In patients receiving intravenous sedation with midazolam or with diazepam plus methohexital, hypnosis was initiated before the administration of the sedative regimen, at a time when the patient was fully conscious and able to concentrate. Because of the much slower onset of intramuscular sedatives, hypnosis was performed following the intramuscular injection of meperidine plus promethazine. In all but two cases, the sedative regimens employed in conjunction with hypnosis (Table 2) were virtually identical to those initially given without hypnosis. The two exceptions were patients K and P: K was originally sedated with midazolam 10 mg and P was sedated with midazolam 5 mg.

In the typical hypnotic procedure, patients were given repeated suggestions of relaxation, sensations of heaviness, the need for their eyes to close, and finally instructions to go to sleep. An alternative method of hypnotic induction, which was used in some patients, involved the hypnotist holding a pencil 8 to 12 inches from the patient. The patient was instructed to focus on the pencil as relaxation suggestions were made. Regardless of the technique employed, the hypnotic induction period generally took about 5 min. The attainment of the Verill sign was

Table 2. Demographic and Clinical History of Individual Patients

Pt.	Age/Sex/Wt	Corah Score	Drug of Abuse	Eye Roll	Sedation Regimen	Route	Dental Procedure	Treatment Outcome
A	15/M/121	20	Cocaine	3	Midazolam 5 mg	IV	Restorative	Excellent
B	21/M/147	18	Cocaine	4	Meperidine 50 mg, promethazine 25 mg	IM	Restorative, extraction	Excellent
C	30/F/185	19	Alcohol	3	Midazolam 5 mg	IV	Restorative, endodontic	Good
D	28/M/240	20	Heroin	4	Meperidine 100 mg, promethazine 100 mg	IM	Restorative, prosthodontic	Fair
E	41/M/126	16	Alcohol	2	Meperidine 50 mg, promethazine 25 mg	IM	Restorative	Excellent
F	29/M/198	16	Heroin	2	Meperidine 100 mg, promethazine 50 mg	IM	Restorative, scaling	Fair
G	18/F/121	18	Morphine	3	Midazolam 5 mg	IV	Extraction	Excellent
H	23/F/179	12	Morphine	4	Midazolam 5 mg	IV	Restorative, prophylaxis	Good
I	41/F/100	18	Methaqualone	3	Meperidine 25 mg, promethazine 25 mg	IM	Restorative, endodontic	Poor
J	50/M/120	14	Methaqualone	3	Meperidine 50 mg, promethazine 25 mg	IM	Scaling	Excellent
K	32/F/191	20	Heroin	4	Meperidine 50 mg, promethazine 25 mg	IV	Scaling	Excellent
L	44/M/158	15	Cocaine	3	Midazolam 10 mg	IV	Restorative, prophylaxis	Good
M	29/F/108	20	Morphine	4	Diazepam 5 mg, methohexital 18 mg	IV	Restorative, scaling	Excellent
N	36/M/116	16	Cocaine, alcohol, heroin	4	Diazepam 10 mg, methohexital 20 mg	IV	Prosthodontic	Fair
O	30/M/132	20	Cocaine, alcohol	4	Meperidine 50 mg, promethazine 50 mg	IM	Prosthodontic	Fair
P	19/F/110	14	Phenmetrazine, barbiturate	3	Meperidine 50 mg, promethazine 50 mg	IV	Restorative, prophylaxis	Good
Q	23/F/145	20	Amphetamine, barbiturate	2	Diazepam 5 mg, methohexital 18 mg	IV	Restorative	Poor
R	24/M/139	18	Amphetamine, alcohol	2	Midazolam 5 mg	IM	Restorative	Fair

an indication that the combined effects of hypnosis and sedation had taken effect.²⁴

The dental procedures performed on these patients included restorative dentistry, crown and bridge preparations, periodontal scalings, and uncomplicated extractions. For local anesthesia, all patients except those with a history of cocaine abuse received 2% lidocaine with 1:100,000 epinephrine. Those dependent on cocaine were administered 3% mepivacaine plain, since epinephrine may increase the likelihood of hypertensive episodes and cardiac arrhythmias in these patients.^{25,26}

HYPNOSIS/SEDATION OUTCOMES

Table 2 summarizes the demographics, preoperative anxiety levels, drug abuse history, eye-roll test scores, sedative regimens employed, dental procedures performed, and the treatment outcomes in each patient. The results of the eye-roll tests suggested that 13 of the 18 patients (those with scores of 3 or 4) were readily hypnotizable

whereas the remaining five (those with scores of 2) exhibited moderate hypnotizability. Seven patients were able to complete their dental treatment without struggle or resistance, and their treatment outcome was rated as excellent. The treatment outcome of four patients who displayed mild resistance that did not interrupt treatment was rated as good. Treatment outcomes in five patients were rated fair because they displayed bodily movements which did interrupt treatment; in two patients treatment could not be completed, and their outcome was rated as poor. There were no side effects observed from the combined hypno-sedative procedure.

DISCUSSION

The use of conscious sedation techniques in drug-dependent patients often poses a clinical dilemma. Because many of these patients exhibit tolerance to opioid and/or sedative-hypnotic drugs, routine dosages of these agents are often ineffective, with higher doses increasing

the likelihood of respiratory or circulatory compromise. In this review of 18 patients, the combination of hypnosis and conscious sedation was generally found to be effective and safe. Hypnosis appeared to augment the effects of parenteral sedative agents and reduce their dosage requirements in this patient population. This theoretically reduces the likelihood of adverse drug reactions.

It should be noted that there are some drawbacks to employing hypno-sedation in a clinical practice. The most obvious one is the time requirement for hypnotic induction. It has previously been reported that even clinicians familiar with hypnotic techniques often fail to employ them because they feel it is easier and less time consuming to simply administer sedative agents.⁴ The results of one survey indicated that among pediatric dentists who commonly deal with children exhibiting phobic behavior, hypnosis is employed by only 6% of these practitioners.²⁷ However, we have found that the hypnotic induction period can take as little as 3 to 5 min, especially if the patient is given an explanation of the technique before their scheduled appointment. Others have reported similar induction periods.⁹

Another limitation of hypnosis is that, like other behavioral and pharmacologic techniques utilized for anxiety control, it does not work for everybody. We employed the eye-roll test prior to the hypno-sedative procedure as a potential predictor of hypnotic outcome. Though three of the four patients (75%) with the lowest eye-roll scores (a score of 2) had only poor or fair treatment outcomes, 4 of 14 patients (28%) with the highest eye-roll scores (a score of 3 or 4) also had poor or fair treatment outcomes. Thus, the eye-roll test seemed to have some predictive value in the ultimate success or failure of the hypno-sedative regimen, but it certainly was not foolproof. Other authors have reported that hypnosis can be employed successfully in patients with low hypnotic susceptibility scores⁹ and that dentist and patient expectations developed during susceptibility testing may interfere with the hypnotic process.^{6,28} In fact, when hypnosis was employed to induce analgesia in human cold pressor and electrical tooth pulp stimulation models, pain reductions were not correlated to hypnotic susceptibility levels.²⁸ For hypno-sedation to be effective, it is necessary for the patient to be motivated, cooperative, and attentive to the suggestions of the hypnotist. Uncooperative patients with short attention spans are poor candidates for hypnotic techniques.

A final consideration to the ultimate success or failure of the hypno-sedation procedure in patients with drug dependencies is the choice of sedative regimens. In the present group of patients, this was mainly based on the anticipated duration of the procedure. Those having relatively short procedures were sedated with intravenous midazolam, or diazepam plus methohexital. Those hav-

ing longer procedures were given the meperidine/promethazine intramuscular regimen. Our hypno-sedation experience with these patients suggests that it may be more important to base the sedative selection on the patient's drug abuse history and choose a regimen where direct tolerance or cross-tolerance with the abused drugs is unlikely to exist. For example, in the current group of patients, those dependent on opioids such as heroin or morphine were likely to show some degree of tolerance to meperidine. Thus, a sedative regimen employing diazepam or midazolam would be a more rational choice in these patients. Likewise, patients abusing barbiturates or alcohol are likely to exhibit tolerances to midazolam, diazepam, and methohexital. In these patients the meperidine/promethazine sedation regimen would represent a more suitable choice. In fact, in five patients (D, F, N, Q, and R) out of seven (70%) in which the treatment outcome was rated poor or fair, the potential for tolerance or cross-tolerance existed between the sedative agents and the drugs of abuse. In contrast, the potential for tolerance or cross-tolerance existed in only one (patient C) of 11 patients (9%) whose treatment outcome was rated good or excellent. This difference in outcome was statistically significant using a χ^2 analysis ($P = 0.006$).

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